PATENT
450100-03108

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant(s)	:	Motoki KATO
Serial No.	:	08/634,122
For	:	APPARATUS FOR ENCODING AND DECODING HEADER DATA IN PICTURE SIGNAL TRANSMISSION
Filed	:	April 19, 1996
Examiner	:	Anand S. RAO
Art Unit	:	2613

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Date of Deposit: September 30, 2004

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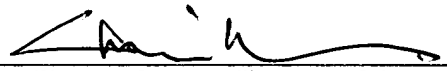
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APPEAL BRIEF OF APPELLANT

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Sir:

This is an Appeal from the Final Rejection by the Examiner dated March 31, 2004, which issued on the above-identified application of claims 15-34. This Brief is submitted in triplicate. The requisite fee set forth in 37 C.F.R. §1.17(c) has been paid.

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REAL PARTY IN INTEREST

The real party in interest in this appeal is Sony Corporation, a Japanese corporation, with offices at 7-35 Kitashinagawa 6-Chome, Shinagawa-ku, Tokyo, Japan, to which appellant has assigned all interest in, to and under this application, by virtue of an assignment recorded on January 13, 1994 at Reel 6848, Frame 0612 of the assignment records of the Patent and Trademark Office.

RELATED APPEALS AND INTERFERENCES

Upon information and belief, the undersigned attorney does not believe that there is any appeal or interference which will directly affect, be directly affected by or have a bearing on the Board's decision in the pending appeal.

STATUS OF THE CLAIMS

Claims 15-22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Raychaudhuri *et al.* (U.S. Patent No. 5,122,875; hereinafter referred to as "Raychaudhuri") in view of Behlen (U.S. Patent No. 5,351,047). Claims 23-34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Raychaudhuri in view of Behlen, and further in view of Meyer (U.S. Patent No. 5,502,493).

The status of the claims are as follows:

Claims allowed: none

Claims objected to: none

Claims rejected: 15-34

The rejected claims 15-34 are set in the Appendix.

Appellant is appealing the Final Rejection of claims 15-34, which constitute all of the currently pending claims in this application.

STATUS OF THE AMENDMENTS

As noted above, an Amendment After Final Rejection Under 37 C.F.R. §1.116 was filed by the Appellant on May 28, 2004. This amendment amended the independent claims to include a phrase "which includes information identifying the type of control data" after the word "extension byte" in the preamble. This amendment, however, was not entered for the purposes of this appeal.

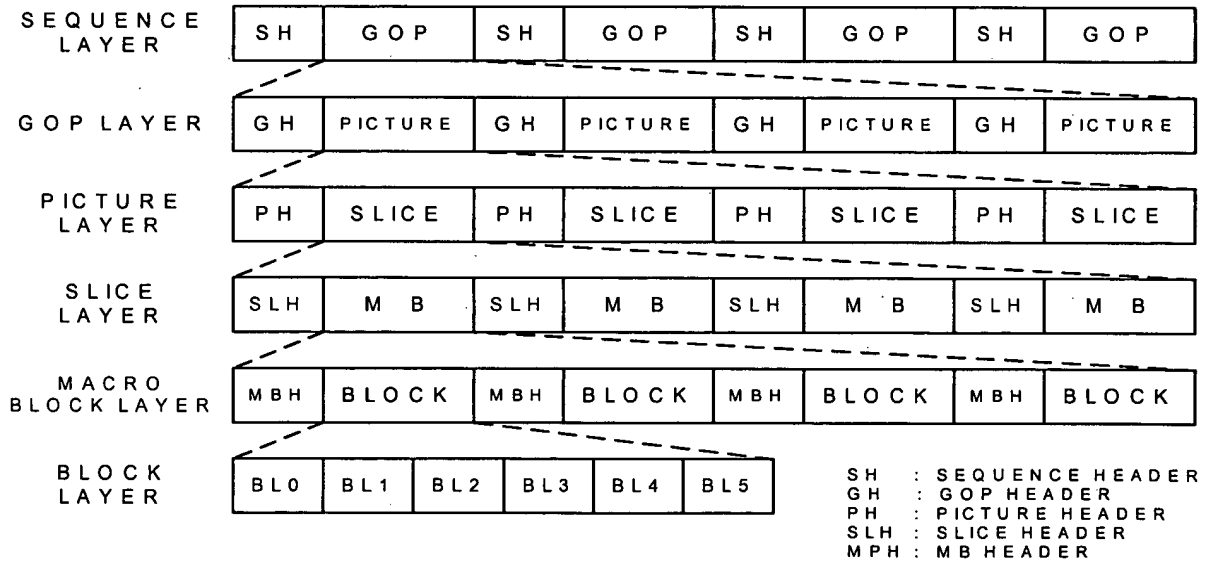
SUMMARY OF THE INVENTION

The present invention is directed to a method for encoding and decoding header data in moving picture signal transmission. More specifically, the present invention is directed to a method for reducing the amount of header data (including extension bytes) in a particular picture encoding layer so that there will be less data transmitted over the transmission channel and thus less chance of losing the data due to problems in the channel.

As explained in the Background section of the Specification, "[t]he header data used in the MPEG 2 is greater in amount (number of bits) as compared with that in the MPEG 1. And in accordance with a quantitative increase of the header data in the bit stream, there arises a problem that the header data is more prone to be subjected to an error. In view of such point, it is preferred to minimize the amount of the header data to be transmitted."

The structure of the MPEG 1 format is shown in FIG. 1 of the subject application, which is reproduced below:

FIG. 1



According to the MPEG 1 format, a series of bits representing a moving picture is divided into six layers: (1) a sequence layer; (2) a group of pictures (GOP) layer; (3) a picture layer; (4) a slice layer; (5) a macro block layer; and (6) a block layer. These layers are illustrated in FIG. 1.

As shown in FIG. 1, the layers include header data, which is used to provide control information relating to the picture data immediately following the header data. For example, the GOP layer includes header data, illustrated as GH. This header data applies to the blocks immediately following the GH. Thus, the first GH (from the left) applies to the first picture, and the second GH applies to the second picture. Header data in the other layers is similarly applied to subsequent data. For example, the first sequence header (SH) applies to the first GOP, and the second sequence header applies to the second GOP.

To address the above-described difficulties in moving picture transmission and decoding, embodiments of the present invention teach a method that substantially reduces duplicate information carried in the header extension bytes of a particular picture-encoding layer of the bit stream (i.e., the encoded picture data). An example will help to illustrate the benefits.

As mentioned above, a sequence header (illustrated as SH in FIG. 1 above) applies to a plurality of pictures. If all of the pictures within a group of pictures make use of the same control information, then the control information can be provided by the higher-level sequence header. This reduces the amount of header data. However, when pictures within a group of pictures require different control information, then the control information cannot be provided by the higher-level sequence header. Instead, the control information must be provided by the individual picture headers. This increases the header data.

Embodiments of the present invention provide that this increase may be reduced where a plurality of sequential picture headers make use of the same control information. In particular, an extension byte of a current header in a specified layer of a bit stream is transmitted only if the extension byte of the current header is different from an extension byte of a prior header in the same specified layer of the bit stream. (Specification, pages 19-20.)

THE ISSUES PRESENTED

The following issues are presented in this appeal:

1. Whether or not claims 15-22 are unpatentable under 35 U.S.C. 103(a) as being obvious over Raychaudhuri and Behlen?
2. Whether or not claims 23-34 are unpatentable under 35 U.S.C. 103(a) as being obvious over Raychaudhuri, Behlen, and Meyer?

GROUPING OF THE CLAIMS

It is the Appellant's intention that claims 15-34 stand or fall together.

ARGUMENTS

Whether or not claims 15-22 are unpatentable under 35 U.S.C. 103(a) as being obvious over Raychaudhuri and Behlen?

Claims 15-22 were rejected under 35 U.S.C. 103(a) as being unpatentable over Raychaudhuri *et al.* (U.S. Patent No. 5,122,875; hereinafter referred to as "Raychaudhuri") in view of Behlen (U.S. Patent No. 5,351,047).

Independent claim 15 recites in part the following:

> "method for generating a bit stream, the bit stream being compatible with MPEG 1 moving picture video standard and comprising an extension byte in at least a header of a specified layer of the bit stream, the extension byte being extension data added when a header includes more control data than is prescribed for a header according to the MPEG 1 standard, the method comprising the steps of:
>
> *storing* an extension byte of an anterior header of said specified layer;
>
> *comparing* an extension byte of a current header of said specified layer to the extension byte of said anterior header; and
>
> *transmitting*, when the extension byte of said current header is different from the extension byte of said anterior header, the extension byte of said current header and an extension start code indicating the beginning of the extension byte of said current header, and not transmitting, when the extension byte of said current header is the same as the extension byte of said anterior header, the extension byte of said current header and an extension start code indicating the beginning of the extension byte of said current header." (emphasis added.)

In describing the above-mentioned 103 rejection of independent claim 15, the Examiner asserts that Raychaudhuri makes a comparison of a video header data versus the next video header data comparison so that multiple version of same video headers are not redundantly

occurring within the transport header. It is respectfully submitted that Raychaudhuri as applied by the Examiner does not disclose such features of claim 15.

It was described in the Summary of the Invention section above that, for example, if all of the pictures within a group of pictures make use of the same control information, then the control information could be provided by the higher-level sequence header. However, when pictures within a group of pictures require different control information, then the control information cannot be provided by the higher-level sequence header. Instead, the control information must be provided by the individual picture headers. To reduce the header data in this situation when pictures within a group of pictures require different control information, redundant header data for individual picture headers within the GOP layer are eliminated.

More specifically, claim 15 recites storing an extension byte of a particular picture header of a specified picture encoding layer, and comparing the extension byte of that particular prior header with an extension byte of a current header in the same specified picture encoding layer. The extension byte of the current header and an extension start code are transmitted only when the extension byte of the current header is different from the extension byte of the particular prior header. Thus, by eliminating the redundant header data within the same picture encoding layer, the amount of header data can be reduced for a case where the data within the same layer requires different control information, such as in MPEG 2.

Raychaudhuri indicates that "[c]ompressed video data hierarchically formatted as indicated in FIG. 3A is coupled to a priority select element 11, which parses the coded data between a high priority channel HP and a low priority channel LP. ... The high priority information includes substantially all of the header information included in the different

hierarchical levels plus the DC coefficients of the respective blocks and a portion of the AC coefficients of the respective blocks (level 6, FIG. 3A)." *Raychaudhuri, column 5, line 63 to column 6, line 8 (emphasis added).* Raychaudhuri further indicates that "[i]n the foregoing description of the transport processor it is assumed that all of the header information provided by the compressor 10 is included in the video data stream provided by the transport processor. It should be recognized that much of the video data header information is also included in the transport headers and as such provides redundant information. In an alternative arrangement, the controller 218 may preclude the converter 201 from accepting video header data which would be redundantly included in the transport block headers, thus enhancing the overall coding efficiency." *Raychaudhuri, column 14, lines 5-15 (emphasis added).*

Therefore, the Raychaudhuri's alternative arrangement suggests that redundant header data in a video layer is not added to the header data in a transport layer. Further, Raychaudhuri fails to teach or suggest storing the extension byte of the prior header in a specified layer and comparing that extension byte of the prior header with the extension byte of the current header in the same specified layer.

Although Behlen discusses using an "extension byte" to extend the range of a control word, Behlen fails to teach or suggest storing the extension byte of the prior header in a specified layer and comparing that extension byte of the prior header with the extension byte of the current header in the same specified layer so that the extension byte of the current header and an extension start code are transmitted only when the extension byte of the current header is different from the extension byte of the prior header.

Accordingly, it is respectfully submitted that independent claim 15 is distinguishable from the applied or proper combination of Raychaudhuri and Behlen. For at least some of the above reasons, it is respectfully submitted that independent claims 17, 19, and 21 are also distinguishable from the applied or proper combination of Raychaudhuri and Behlen.

Claims 16, 18, 20, and 22 are dependent from one of the independent claims, and due to such dependency, are also believed to be distinguishable from the applied or proper combination of Raychaudhuri and Behlen for at least the reasons previously described.

Whether or not claims 23-34 are unpatentable under 35 U.S.C. 103(a) as being obvious over Raychaudhuri, Behlen, and Meyer?

Claims 23-34 are dependent from one of the independent claims 15, 17, 19, and 21, and due to such dependency, are also believed to be distinguishable from the applied or proper combination of Raychaudhuri and Behlen for at least the reasons previously described.

The Examiner indicated that Meyer discloses the use of extension start code identifiers in order to allow for expansion and customization of the video compression syntax of the MPEG standard. Thus, Meyer fails to teach or suggest storing the extension byte of the prior header in a specified layer and comparing that extension byte of the prior header with the extension byte of the current header in the same specified layer so that the extension byte of the current header and an extension start code are transmitted only when the extension byte of the current header is different from the extension byte of the prior header.

Accordingly, it is respectfully submitted that claims 23-34 are distinguishable from the applied or proper combination of Raychaudhuri, Behlen, and Meyer.

CONCLUSION

Claims 15-22 are not obvious in view of the applied or proper combination of Raychaudhuri and Behlen. Accordingly, it is respectfully submitted that the Examiner erred in rejecting claims 15-22 and reversal of such rejections by this Honorable Board is solicited.

Claims 23-34 are not obvious in view of the applied or proper combination of Raychaudhuri, Behlen, and Meyer. Accordingly, it is respectfully submitted that the Examiner erred in rejecting claims 23-34 and reversal of such rejections by this Honorable Board is solicited.

Respectfully submitted,

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APPENDIX

CLAIMS ON APPEAL

15. Picture encoding method for generating a bit stream, the bit stream being compatible with MPEG 1 moving picture video standard and comprising an extension byte in at least a header of a specified layer of the bit stream, the extension byte being extension data added when a header includes more control data than is prescribed for a header according to the MPEG 1 standard, the method comprising the steps of:

storing an extension byte of an anterior header of said specified layer;

comparing an extension byte of a current header of said specified layer to the extension byte of said anterior header; and

transmitting, when the extension byte of said current header is different from the extension byte of said anterior header, the extension byte of said current header and an extension start code indicating the beginning of the extension byte of said current header, and not transmitting, when the extension byte of said current header is the same as the extension byte of said anterior header, the extension byte of said current header and an extension start code indicating the beginning of the extension byte of said current header.

16. Picture encoding method according to claim 15, wherein said specified layer is a picture layer.

17. Picture decoding method for decoding a bit stream, the bit stream being compatible with MPEG 1 moving picture video standard and comprising an extension byte in at least a header of a specified layer of the bit stream, the extension byte being extension data added when a header includes more control data than is prescribed for a header according to the MPEG 1 standard, the method comprising the steps of:

storing an extension byte of an anterior header of said specified layer; and

decoding said bit stream, wherein data related with a current header of said specified layer is decoded using the extension byte of said anterior header when said current header does not include an extension start code indicating the beginning of the extension byte of said current header.

18. Picture decoding method according to claim 17, wherein said specified layer is a picture layer.

19. Picture encoding apparatus for generating a bit stream, the bit being compatible with MPEG 1 moving picture video standard and comprising an extension byte in at least a header of a specified layer of the bit stream, the extension byte being extension data added when a header includes more control data than is prescribed for a header according to the MPEG 1 standard, the apparatus comprising:

means for storing an extension byte of an anterior header of said specified layer;

means for comparing an extension byte of a current header of said specified layer to the extension byte of said anterior header; and

means for transmitting, when the extension byte of said current header is different from the extension byte of said anterior header, the extension byte of said current header and an extension start code indicating the beginning of the extension byte of said current header, and not transmitting, when the extension byte of said current header is the same as the extension byte of said anterior header, the extension byte of said current header and an extension start code indicating the beginning of the extension byte of said current header.

20. Picture encoding apparatus according to claim 19, wherein said specified layer is a picture layer.

21. Picture decoding apparatus for decoding a bit stream, the bit stream being compatible with MPEG 1 moving picture video standard and comprising an extension byte in at least a header of a specified layer of the bit stream, the extension byte being extension data added when a header includes more control data than is prescribed for a header according to the MPEG 1 standard, the apparatus comprising:

means for storing an extension byte of an anterior header of said specified layer; and

means for decoding said bit stream, wherein data related with a current header of said specified layer is decoded using the extension byte of said anterior header when said current header does not include an extension start code indicating the beginning of the extension byte of said current header.

22. Picture decoding apparatus according to claim 21, wherein said specified layer is a picture layer.

23. Picture encoding method according to claim 15, wherein said extension start code includes an extension start code identifier.

24. Picture encoding method according to claim 23, wherein said extension start code identifier is a 4-bit code.

25. Picture encoding method according to claim 23, wherein said extension start code identifier is encoded to identify the type of the control data.

26. Picture decoding method according to claim 17, wherein said extension start code includes an extension start code identifier.

27. Picture decoding method according to claim 26, wherein said extension start code identifier is a 4-bit code.

28. Picture decoding method according to claim 26, wherein said extension start code identifier is encoded to identify the type of the control data.

29. Picture encoding apparatus according to claim 19, wherein said extension start code includes an extension start code identifier.

30. Picture encoding apparatus according to claim 29, wherein said extension start code identifier is a 4-bit code.

31. Picture encoding apparatus according to claim 29, wherein said extension start code identifier is encoded to identify the type of the control data.

32. Picture decoding apparatus according to claim 21, wherein said extension start code includes an extension start code identifier.

33. Picture decoding apparatus according to claim 32, wherein said extension start code identifier is a 4-bit code.

34. Picture decoding apparatus according to claim 32, wherein said extension start code identifier is encoded to identify the type of the control data.